

# इंटरनेट

# मानक

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 512 (1988): Oil of Citronella (Java) [PCD 18: Natural and Synthetic Fragrance Materials]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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IS : 512 - 1988  
(Reaffirmed 1996)

REAFFIRMED

2003

*Indian Standard*

SPECIFICATION FOR  
OIL OF CITRONELLA (JAVA)

(Second Revision)

Third Reprint JANUARY 2002

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BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

**AMENDMENT NO. 1 MAY 1997**  
**TO**  
**IS 512 : 1988 SPECIFICATION FOR OIL OF**  
**CITRONELLA (JAVA)**

*( Second Revision )*

( Page 2, clause 6.2, line 3 ) — Substitute 'IS 1070 : 1992†' for 'IS 1070 : 1977†'.

( Page 2, foot-note with '†' mark ) — Substitute 'Reagent grade water ( third revision )' for the existing matter.

[ Page 2, Table 1, Sl No. (vii) ] — Insert '\$' at Sl No. (vii), and insert the following foot-note at the end of Table 1:

\$Low values are obtained for this isolate, if the usual hydroxylamine hydrochloride technique is used. Fairly satisfactory results may be obtained, if the solution is well cooled and the titration is carried out at low temperature (like -10°C).

( Page 3, Appendix A, clause A-1.1 ) — Substitute the following GC conditions for the existing:

- a) *Column:*
- |                     |                              |
|---------------------|------------------------------|
| i) Material         | Stainless steel              |
| ii Length           | 5.49 m                       |
| iii) OD             | 0.635 cm                     |
| iv) I D             | 0.318 cm                     |
| v) Stationery phase | FFAP*, 10 percent by mass    |
| vi) Solid support   | Chromosorb WHP (80-100 mesh) |
- b) *Carrier Gas:*
- |           |                       |
|-----------|-----------------------|
| Flow rate | Nitrogen<br>30 ml/min |
|-----------|-----------------------|
- c) *Conditions:*
- |                                   |       |
|-----------------------------------|-------|
| i) Column temperature, isothermal | 140°C |
| ii) Injection port temperature    | 250°C |
- d) *Detector:*
- |                 |        |
|-----------------|--------|
| i) Type         | F.I.D. |
| ii) Temperature | 250°C  |

(Page 3, Fig. 1) — Substitute the following figure for the existing:

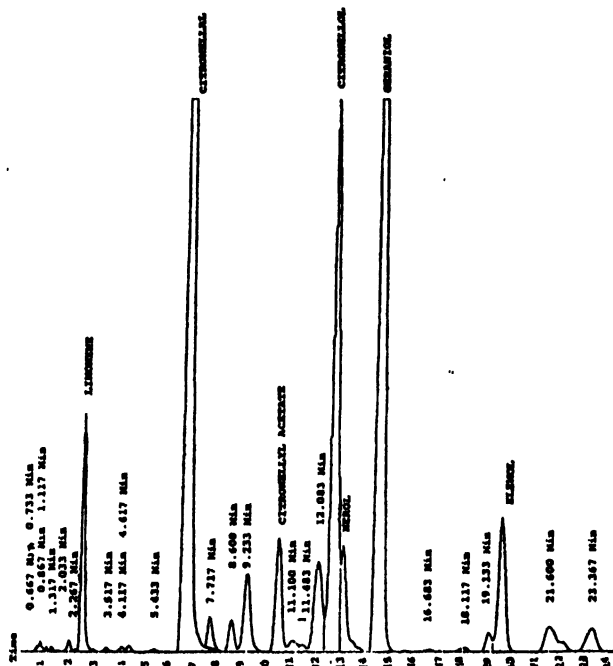


FIG. 1 TYPICAL CHROMATOGRAM OF OIL OF CITRONELLA (JAVA)  
(PCD 18)

# Indian Standard

## SPECIFICATION FOR OIL OF CITRONELLA ( JAVA )

### ( Second Revision )

#### 0. FOREWORD

**0.1** This Indian Standard ( Second Revision ) was adopted by the Bureau of Indian Standards on 25 February 1988, after the draft finalized by the Natural and Synthetic Perfumery Materials Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

**0.2** This standard was originally published in 1954 and subsequently revised in 1961 after incorporating the new requirement for steam distillation residue. The revised standard covered two types of citronella oil namely, Ceylon type and Java type as the oil produced in Sri Lanka approximates closely to Java type oil. The Sectional Committee responsible for the preparation of this standard felt that it should be revised in the light of prevalent trade practices in perfumery technology and also to suit the material currently being manufactured and sold in the country.

**0.3** In the present revision, the Committee decided to confine the requirements to only Java type oil of citronella and eliminating the specification of Ceylon type oil of citronella since the latter is not yet produced commercially in India. Gas chromatographic method for determination of purity of oil which is progressively used in the country, has been included in Appendix A for guidance only.

**0.4** Oil of citronella (Java) is one of the most important essential oils used in perfumery industry. It acts as main starting material for the

production of numerous important perfumery materials such as geraniol, citronellal and their derivatives. The oil as such also finds extensive use in perfumery, various household cleansers, technical products, insecticides, etc.

**0.5** Earlier this oil was imported in India. However, in the recent past, citronella grass of Java type is being cultivated extensively in various parts of India particularly in Assam ( Eastern regions ). The oil produced in India has been found to be, by and large, comparable with the imported Java type oil.

**0.6** In the preparation of this standard, considerable assistance has been derived from E.O.A. No. 14, 'Citronella Oil Java type', published by Essential Oil Association of USA, New York and ISO 3848 : 1976 Oil of Java citronella, published by the International Organization for Standardization.

**0.7** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2 - 1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

\*Rules for rounding off numerical values ( revised ).

#### 1. SCOPE

**1.1** This standard prescribes the requirements and the method of sampling and test for oil of citronella (Java).

#### 2. TERMINOLOGY

**2.1** For the purpose of this standard, the definitions given in IS : 6597 - 1988\* shall apply.

#### 3. REQUIREMENTS

**3.1 Description** — The material shall be obtained

by hydro-steam distillation of the freshly cut or partially dried citronella grass of Java type of botanical species — *Cymbopogon winterianus* Jowitt (syn. *Andropogon nardus* auct. in the part non Linn. ), Var. — mahapengiri.

**3.2 Solubility** — The material shall be soluble in 1 to 2 volumes of ethanol ( 80 percent by volume ) when tested as prescribed in IS : 326 ( Part 6 ) - 1986\*.

**3.3** The material shall also comply with the requirements given in Table 1.

\*Glossary of terms relating to natural and synthetic perfumery materials ( first revision ).

\*Methods of sampling and test for natural and synthetic perfumery materials: Part 6 Determination of solubility.

TABLE 1 REQUIREMENTS FOR OIL OF CITRONELLA ( JAVA )  
( Clause 3.3 )

Sl. No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Indian Standard	Appendix
(1)	(2)	(3)	(4)	(5)
i)	Colour and appearance	Pale yellow to light tan clear liquid	IS : 326 ( Part 2 ) - 1980*	—
ii)	Odour	Characteristic citrus grassy with rose undertone	IS : 2284 - 1988†	—
iii)	‡Relative density at 27°C	0.874 3 to 0.889 3	IS : 326 ( Part 3 ) - 1980*	—
iv)	Optical rotation	—0.5 to —5°	IS : 326 ( Part 4 ) - 1980*	—
v)	‡Refractive index	1.462 4 to 1.471 4	IS : 326 ( Part 5 ) - 1986*	—
vi)	Total acetylizable matter calculated as geraniol, percent by mass, <i>Min</i>	85	IS : 326 ( Part 9 ) - 1980*	—
vii)	Total carbonyl compounds calculated as citronellal, percent by mass, <i>Min</i> (using 1 g of test sample, standing time of 15 minutes, by hydroxylammonium chloride method)	35 to 45	IS : 326 ( Part 11 ) - 1986*	—
viii)	Mineral oil	No readable separation of mineral oil	IS : 326 ( Part 15 ) - 1984*	—
ix)	Steam distillation residue percent by mass, <i>Max</i>	3	—	B

\*Methods of sampling and test for natural and synthetic perfumery materials:

Part 2 Preliminary examination of perfumery materials and samples ( *second revision* ).

Part 3 Relative density ( *second revision* ).

Part 4 Determination of optical rotation ( *second revision* ).

Part 5 Determination of refractive index ( *second revision* ).

Part 9 Determination of ester value after acetylation and free alcohols ( *second revision* ).

Part 11 Determination of carbonyl value and content of carbonyl compounds.

Part 15 Detection of petrolatum and mineral oils ( *second revision* ).

†Method for olfactory assessment of natural and synthetic perfumery materials ( *first revision* ).

‡The correction factors for relative density and refractive index for each degree Celsius change in temperature are 0.000 64 and 0.000 38, respectively.

## 4. PACKING AND MARKING

**4.1 Packing** — The material shall be supplied in glass bottles, or in suitable containers as agreed to between the purchaser and the supplier. However, aluminium containers shall be avoided. The containers shall be tightly closed and nearly full.

**4.2 Marking** — Each container so filled shall bear legibly and indelibly the following information:

- Name of the material;
- Name of the manufacturer and his recognized trade-mark, if any;
- Batch number and date of manufacture; and
- Net and gross mass.

**4.2.1 Standard Marking** — The containers may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986, and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection,

testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

## 5. SAMPLING

**5.1 Representative samples** of the material shall be drawn as prescribed in IS : 326 ( Part 1 ) - 1984\*.

## 6. TEST METHODS

**6.1 Tests** shall be conducted as prescribed in col 4 and 5 of Table 1.

**6.2 Quality of Reagents** — Unless specified otherwise, pure chemicals and distilled water ( see IS : 1070 - 1977† ) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

\*Methods of sampling and test for natural and synthetic perfumery materials: Part 1 Sampling.

†Specification for water for general laboratory use ( *second revision* ).



## APPENDIX A

( Clause 0.3 )

## GAS CHROMATOGRAPHIC ANALYSIS OF OIL OF CITRONELLA ( JAVA )

## A-0. GENERAL

A-0.1 The chromatographic conditions given here are for guidance only.

A-0.2 Outline of the Method — A sample of the material is dissolved in a suitable solvent ( for example, cyclohexane and diethyl ether ) and is injected into the gas chromatograph when it is carried by the carrier gas from one end of the column to the other. During its movement, the constituents of the sample undergo distribution at different rates and ultimately get separated from one another. The separated constituents emerge from the end of the column one after another and are detected by suitable means whose response is related to the amount of a specific component leaving the column.

## A-1. APPARATUS

A-1.1 Any gas chromatograph capable of being operated under conditions suitable for resolving the individual constituents into distinct peaks may be used. The typical chromatogram for citronella (Java) using a chromatograph with the following chromatographic conditions is shown in Fig. 1.

## a) Column:

i) Material	Copper
ii) Length	5.49 m
iii) OD	0.635 cm
iv) ID	0.476 cm
v) Stationary phase	FFAP*, 10 percent by mass
vi) Solid support	Chromosorb WAW 60-80 mesh

## b) Carrier Gas

Nitrogen

## c) Conditions:

- i) Column temperature, 140°C isothermal
- ii) Injection port temperature 200°C

## d) Detector:

- i) Type F.I.D.
- ii) Temperature 280°C

## A-2. CALCULATION

A-2.1 Area Measurement ( see Note ) — Since

\*Free fatty acid phase (FFAP) in carbowax 20 M treated with nitrophthalic acid.

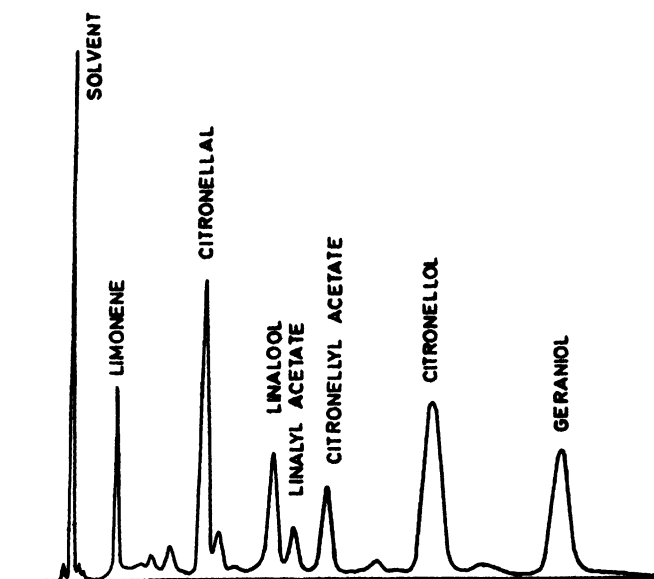


FIG. 1 TYPICAL CHROMATOGRAM OF OIL OF CITRONELLA

normal peaks approximate a triangle, the area is measured by multiplying the peak height with the width of half-height. The normal peak base is not taken since large deviations may be observed due to tailing or adsorption. This technique is rapid, simple and fairly accurate when peaks are symmetrical and of reasonable width.

NOTE — Other methods of area measurement, namely, triangulation, disc integrator and electronic digital integrator, if fixed with GLC machine, would be of great advantage

**A-2.2 Area Normalization** (see Note) — By normalizing, it is meant, calculating the percentage composition by measuring the area of each and dividing the individual areas by total area, for example,

$$\text{Percentage of } A = \frac{\text{Area of } A}{\text{Total area}} \times 100$$

NOTE — Internal standardization can be used if pure appropriate internal standard is available. This method is relative or indirect calibration.

## APPENDIX B

(Table 1. Item (ix))

### DETERMINATION OF STEAM DISTILLATION RESIDUE

#### B-1. REAGENTS

**B-1.1 Petroleum Ether** — double distilled, having boiling point range 40 to 50°C.

**B-1.2 Sodium Sulphate** — anhydrous (see IS : 255 - 1982\*).

#### B-2. PROCEDURE

**B-2.1** Place 5 g of the material, accurately weighed to the nearest mg, in a 500-ml distilling flask. Distil the material with steam under atmospheric pressure for at least 3 hours. Transfer the mixture of water and residue to a separator, rinsing the flask with two successive 20 ml portions of petroleum ether. Add the rinsings to the separator and shake vigorously for one minute. Allow to separate for 30 minutes or more, reject

the aqueous layer, transfer the petroleum ether solution to a flask together with sodium sulphate.

**B-2.2** Filter the petroleum ether solution through a filter paper in a previously weighed saponification flask containing some pumice stone. Rinse the flask and filter paper once more with some ether.

Gently distil off or evaporate the petroleum ether and dry the residue to constant mass within 0.01 g. at 80 ± 1°C.

#### B-3. CALCULATION

$$\text{Steam distillation residue.} \quad \frac{M_1 \times 100}{M_2}$$

Percent by mass

where

$M_1$  = mass in g of the residue, and

$M_2$  = mass in g of the sample taken for the test.

\*Specification for sodium sulphate, anhydrous (technical grade) (second revision).

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#### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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